data file version of the image. The image can be interpreted manually by a technician, or with the use of analytical software. An image dissector 42 other than a CCD may be used to convert the image of light into an electronic data format alternatively.

Referring to FIG.6, as used herein the term "volume" for volume of the field can mean the volume itself, or can refer to the through-plane thickness 78 of the imaged field because one can be readily determined from the other given the cross-sectional area of the field. As used herein, the term "through-plane thickness" refers to a line of sight ~~which~~that corresponds to the shortest distance 78 between the interior chamber surface 80 of the first wall 30 and the interior chamber surface 82 of the second wall 32.

Referring to FIGS. 3 and 4, in a first embodiment of the means for determining the volume of one or more fields within the sample, the label reader 38 reads the container label 28 which communicates the chamber 20 geometry to the apparatus 10 and with that information the volume of the field can be determined. For example, if the label 28 provides the slope values of the chamber first wall 30 and second wall 32 and a through-plane thickness 78 value at a known spatial location, the volume of a field at any position within the chamber 20 can be determined provided the slope values are constant for both walls 30,32 for the entire chamber 20.

In a second embodiment of the means for determining the volume of one or more select fields within the sample, the volume is determined by sensing the colorant signal from a sample field of unknown volume containing fluid sample having a known colorant concentration. The colorant signal magnitude to colorant concentration ratio is communicated to the apparatus 10 through the container label 28 and label reader 38. As used within this specification, the term colorant is defined as any reagent that produces a sensible signal by fluorescent emission, or by absorption of light at a specific wavelength, that can be quantified by the apparatus 10. The signal magnitude to colorant concentration may also be determined by comparison with a second known material such as a pad 34 of material with stable

characteristics which is referenced by the apparatus 10 and used to calibrate the response of the colorant.

In a third embodiment of the means for determining the volume of one or more select fields, the volume is determined by comparing colorant signal from at least two sample fields. The first and second sample fields contain colorant of unknown concentration uniformly distributed within the fluid sample. The first field, referred to here as the calibration field contains a geometric characteristic-type feature of known height or volume. Examples of geometric characteristics include a step, a cavity, or a protuberance of known height or volume within one or both walls, or an object of known volume. The volume or height of the geometric characteristic is provided to the Programmable Analyzer 16 through the container label 28 and label reader 38. The change in sensible signal due to the displacement of colorant by the known ~~feature~~ geometric characteristic in the calibration field is measured through the field illuminator 40, and a calibration value of change in sensible signal per volume is calculated by the Programmable Analyzer 16 and stored. To determine the volume of the second, or unknown field, the Programmable Analyzer 16 takes the signal measured from the second field and multiplies it by the signal/volume ratio of the calibration field to arrive at a volume for the second field. This method of volume determination is further described in ~~co-pending application number _____ (Attorney's docket no. UFB-013)~~United States Patent No. 6,127,184.

In a fourth embodiment of the means for determining the volume of one or more select fields, the volume of the field(s) is determined using interferometric techniques to measure the through-plane thickness. The hardware necessary to perform the interferometric techniques includes a monochromatic light source and a beamsplitter which operate together to form interference patterns, where the number of observable interference fringes is related to the separation of the chamber walls 30,32.

In a fifth embodiment of the means for determining the volume of one or more select fields, the container chamber 30 includes specular surfaces on which a virtual reflected image

may be detected by the apparatus 10. The specular surfaces are the two wall surfaces 80,82 in contact with the biologic fluid, or the outer surfaces if the wall thicknesses are known. The apparatus 10 detects the virtual reflected image on one of the specular surfaces and then refocuses on the virtual reflected image formed on the other specular surface. The distance that the field illuminator optics 46 ~~moves~~ move between the two images is the through-plane thickness 78 of the chamber 20 in the particular field. A sixth and related embodiment is the use of identifiable patterns on each of the two chamber surfaces 80,82, where these patterns are used as focal targets, as opposed to the virtual images used in the fifth embodiment, and are disclosed in ~~US patent application number _____. These techniques are fully described in co-pending application numbers _____ (applicant's docket number UFB-013, P-38098, and P-4047) which are commonly assigned to Becton Dickinson and Company~~United States Patent Nos.5,781,303 and 6,127,184 .

II. The Sample Transport Module:

The Sample Transport Module 14 includes a mechanism 84 for transferring biologic fluid sample from the container reservoir 22 to the container chamber 20 and a container positioner 86. When the preferred container 18 is used, the mechanism 84 includes a valve actuator, for example rod 90, that selectively actuates the container valve 26 to transfer fluid sample from the container reservoir 22 to the container chamber 20. The mechanism 84 for transferring fluid sample from the reservoir to the chamber may be automated or manual and in all cases is sufficient to operate the valve 26, if any, disposed in the container 18. For those tests which are not time related, the biologic fluid sample may be placed directly into the container chamber 20 thereby obviating the need for a reservoir 22, a valve 26, and a valve actuator 90.

In all of its embodiments, the positioner 86 is operable to selectively change the position of one of the container 18 or the field illuminator 40 relative to the other of the container 18 or the field illuminator 40, such that all regions of the sample within the chamber 20 can be selectively illuminated and imaged. The container 18 can be initially located relative